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ABSTRACT

The notion of comparing in curriculum evaluation is discussed, and some approaches to making comparative judgments about program effectiveness during the formative and summative evaluation stages are examined. Sources of information provided by external and internal program comparisons are described, and a model in which a policy capturing procedure for predicting administrative decisions based on comparison data is advanced. Evaluation methodologies appropriate to comparative evaluation are discussed with support given to a matrix sampling procedure for comparison selection based upon program costs, performance appraisals, and program spinoffs at different points in product development. (Author)

UNDERTAKING PROGRAM COMPARISONS IN CURRICULUM EVALUATION[1]

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The appropriateness of using comparison groups in assessing the merits of educational programs and products has been discussed from a methodological (e.g., Stufflebeam, 1969; Stufflebeam et al, 1971) and philosophical (e.g., Scriven, 1967) standpoint. Methodologically, Stufflebeam has argued against their use because of the infeasibility of randomizing the units of analysis (e.g., pupils, classrooms) to all treatment conditions; many of Stufflebeam's objections to the use of comparison groups, and also to classical experimental design in evaluation activities, have been responded to by Tatsuoka (1972).

Carroll (1965), Cronbach (1963), and Cronbach and Suppes (1969) also have criticized the employment of comparison groups, claiming that little knowledge can be acquired from a global assessment of several treatments, each of which has many variables influencing outcomes differentially, or from comparing treatments which do not have identical performance objectives or considerable communality between their goals. On the other hand, Cohen (1970) and Glennan (1969) have emphasized that a major methodological and interpretative problem in evaluating the impact of educational programs, particularly on the national level, is the absence of satisfactory comparison or reference groups.

To date, few practical recommendations have been made concerning the criteria for selection of appropriate comparison groups; also, the types of

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questions which are answered for program personnel through the use of different comparison groups have not been clearly defined. Scriven has advanced the notion of the critical comparison in program evaluation in which the emphasis in making comparative judgments about the worth or merit of a particular product is placed on input (effectiveness in the direction of resources) and opportunity (what else could have been done with available funds)[2] costs, performance data and the weighted values of the goals of the curricula under examination. Scriven's model, however, gives minimal consideration to the use of comparison information in making the critical internal programmatic decisions during the formative (revision) period of development. This paper will discuss the notion of "comparing" as it relates to the formative and summative phases of program evaluation and will present an example of one approach that the evaluator can employ to acquire useful comparison information for decision-makers involved in program development.

FORMATIVE COMPARISONS

Comparative evaluation during the formative period can be differentiated from summative-comparative principally by the audiences which are provided evaluative information about the program, by the types of questions for which the data must provide answers, and by the methodological approach taken to data analysis and presentation. In collecting evaluative information during the formative period the evaluator's first concern must be with the questions asked by the developers. During this period, the comparative information is supplied internally mainly to support development decisions made at critical

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[2]Much of the philosophy of cost benefit analyses has to do with the alternative directions that might have been considered with available funds by an ideal decision-making body. However, continued direction of resources to the originally contrived program goals usually can be justified if the needs assessment from which the goals originated was well designed and th. roughly documented.

revision or milestone points; consequently, the answers supplied by the data pertain less to the merit of the program as it relates to competitors than they do to whether the components of the program conform to the revision standards established by the development-evaluation team.

One comparative approach used for revision purposes, which is related particularly to cost effectiveness, is to install a less expensive alternative to the present program in several classrooms and collect performance data on both the original and the less costly version. The media used in the instructional materials, for example, may be less sophisticated than those employed in the original, or the amount of time devoted to preservice and inservice staff development and training may be reduced. This approach assumes that the program, or program component, has attained near maximal performance utility in its present formative state and now can be revised based only upon the cost data from a less expensive model implemented on a limited scale; thus, the program is used as its own baseline.

During the formative period, the data are used to describe the effects which result from use of the product and to demonstrate relationships between and among input and output variables. During the summative stage, the concern is mainly with making inferences beyond the effects of the program under the particular conditions of its implementation. This difference between formative and summative methodologies somewhat parallels the distinction which has been made between the correlational (descriptive) and experimental (inferential) disciplines (Cronbach, 1957) in scientific psychology.

One approach to making program comparisons within a correlational framework is the time series method. In its simplest form, a treatment, or some intervention, is introduced into a series of measures collected upon a group or individual and change in performance over baseline behavior is examined.

Usually, time series procedures, such as panel designs, are quite sophisticated and require complex multivariate statistical techniques.

The factor analytic procedures, S- and T-techniques (Cattell, 1946c, 1952a, 1952b), which study the covariation in persons and occasions, are examples of the general time series approach and are quite appropriate for use in curricula which test students regularly, such as on unit tests for criterion mastery. S-technique involves the intercorrelation of the scores of N individuals over a series of occasions on one test. It is used in obtaining "person" factors and is a useful measurement technique in programs which direct resources differentially to students with the intention of changing particular aptitudes or traits among clusters of students over a period of time. It also might be used to test the sequential nature of a program whose content emphasis changes based upon what has been acquired previously by the student.

T-technique is the transpose of S-technique and indicates how X occasions covary over a group of individuals on one test. With two occasions, test-retest reliability examplifies the use of T-technique. When the trait assessed by the test is subject to fluctuation based upon the influence of some form of intervention, this technique is then useful for determining the occasion factors which affect test performance.

The use of goal-free evaluation and the consequent attainment of spin-off effects (effects derived from the use of the product that are independent from those obtained in direct assessment of the program's stated goals and objectives) has been discussed as an important summative tool (Scriven, 1973). The extension of goal-free evaluation into the formative arena also has been discussed by Scriven (1972). Essentially, the goal-free formative evaluator (GFFE) can provide the product developer a "preview of the summative evaluation"

in which undesirable side effects are anticipated and desirable ones are cultivated. Scriven stresses that the presence of the GFFE also will permit the staff evaluator to "have support from an external source for some personal -- and previously unshared -- worries or complaints." Of course, a more cost-effective alternative to this approach is to budget weekly therapy sessions for all inhouse evaluators.

It would seem that the fluid nature of the program during its initial developmental stages would provide for the occurrence of unanticipated consequences even more than the summative period in which revision has focused for some time upon present goals. Consequently, the isolation of possible unintended program effects during the formative period could give direction to the specific allocation of funds in order to cultivate the spin-off as the program progresses through its revision cycle.

SUMMATIVE COMPARISONS

Assessment of the program in a hands-off field trial situation during its advanced stage of development typically involves comparisons with a competitor or some other external standard. In this stage major emphasis is placed upon the use of inferential statistical techniques in making judgments about the relative contribution of the program in relation to what exists already. As in the revision stages, selection of the appropriate comparison depends upon the questions asked and the decisions supported by the data. Some intergroup comparisons are discussed below.

Comparison group -- no intervention. This group most nearly resembles the traditional control in that its members receive no planned intervention (e.g., day care). Performance data is minimal because comparisons between curriculum objectives cannot be undertaken. Cost appraisals also cannot be

considered in the overall comparison. This group is particularly appropriate in accounting for effects due only to student maturation.

Many investigators also have used norms on standardized achievement and ability instruments to assess gain or relative status of a target group in relation to a representative sample also receiving some form of intervention. Very often, however, these instruments have been normed on groups unrepresentative of the sample under consideration, thus producing methodological and interpretative problems. Some of these problems result from the fact that many standardized tests do not reflect the linguistic and cultural background differences which exist between minority and norm groups. Standardized tests do not reflect the variations within ethnic groups which are due principally to regional characteristics and places of origin. Translations of tests from English to Spanish have not considered problems such as those due to differences in word frequency and word potency between the languages. Patterns of ability are different for different ethnic groups (Lesser, Fifer and Clark, 1965), thus producing an interaction of the traits of different ethnic groups with different items. Many alternatives to standardized testing, each with their own disadvantages, have been advanced; these include reliance upon criterion-referenced measures to assess performance objectives in both the program and comparison groups and the adaptation of standardized tests for specific local populations.

Comparison group -- competing curriculum. The comparison group-competing curriculum is the most critical of the possible summative comparisons in that the program's capability to withstand competitive testing is assessed. Here it is possible for the program to emerge either as having merit or as being a trivial contribution. The appropriate comparison group will provide the developer information which will be of assistance in making the eventual decisions regarding the program's readiness to be advanced to the stage in

which it is adopted by early innovators.

Comparison group selection often will be based upon variables such as the similarity of the curriculum's goals and objectives to those of the home team's,the characteristics of the population whose needs the product is serving, and the costs involved per classroom in installing each product. Different audiences, including the developer, funding source, and school superintendent, will also require different information regarding the readiness of the curriculum for adoption. Each audience, for example, may emphasize a particular medium through which information should be provided, whether norm- or criterion-referenced tests, observation techniques, or teacher and parental opinions. Also of importance in the decision to release the product is if it fills an urgent social need or is vying with several competitors. Each of these variables will influence the adoption decision; consequently, it is important to know the relative subjective weights attached to all of these information sources by the different audiences and to base comparison selection and information gathering upon the appropriate variables.

POLICY CAPTURING

Because of the necessity to specify the information requirements of the different audiences at particular stages of product development, an objective procedure for capturing the policy upon which individuals base their decisions regarding the superiority of one product over another, or whether to advance the product from one stage to the next, would be of assistance. Several procedures have been advanced for doing this (e.g., Christal, 1968). When placed in a policy capturing framework they involve either simulation of decision-making situations or making use of actual situations which have occurred or are presently occurring. When a decision is made by an individual

or group about another person or object, then the stimulus characteristics (e.g., test scores, sex or ethnic characteristics of both the decision-maker and the object of the decision) are documented and multiple regression equations are used to "capture" the apparent weightings assigned by judges to the different variables present in the situation. The weights then are used for making predictions about how the judges would respond in future situations having characteristics similar to the ones from which the original weights were obtained.

One approach to capturing the policies of the audiences involved in product development is to provide realistic situations in which decisions must be made about program advancement, based upon information provided by an evaluative source, and then to determine the particular criteria on which the decision was based. For example, information might be provided to decision-makers concerning the cost of the program as well as the quality of performance and spin-off data obtained during the different stages of program development. It is conceivable that different weights will be assigned to these factors based upon their relative importance in contributing to revisic decisions at the different developmental stages; the emphasis placed upon eac. of these factors within each stage also may vary depending upon the audience being addressed.

In order to test these suppositions, a questionnaire was designed in which information was provided to program developers and evaluators concerning the status of a program at three different stages of development. Twenty-one situations involving a program in design test, pilot test, or field test were included within the questionnaire and respondents were asked to decide, on the basis of cost, performance and spin-off data,[3] (a) if the program could

[3]The questionnaire may be found in Appendix B. Definitions of design, pilot, and field test, as well as of cost, performance, and spin-off data, were provided to the respondents; these definitions are given at the beginning of the questionnaire.

be moved to the next developmental stage, and (b) which data source (cost, performance, or spin-offs) was relied upon most, and which least, in making the decision in (a). Seven situations were provided for each developmental stage, with each of the three data sources being varied in terms of whether it could be perceived by the different audiences as high (e.g., high cost), medium, or low.

The questionnaire was pilot tested, revised, and then administered to five individuals with extensive experience in educational product development (average, eight years) and five individuals with evaluation experience (average, five years). Evaluators were asked to respond as if they were product developers. The principal questions which were examined were: (1) is one data source relied upon more heavily than another source at different stages of development? (2) do evaluators and product developers emphasize different sources of data at each developmental stage? and (3) do evaluators and product developers agree as to when the product should be advanced from one stage to the next?

Generally, both developers and evaluators placed emphasis on the same data sources throughout the three stages; both relied upon performance more than cost, and upon cost more than spin-off data. There was a moderate tendency for reliance upon cost and performance to converge as the product moved into the field test stage. Spin-off data was uniformly cited by both evaluators and developers as being the least important variable in decision-making throughout all stages.

While both groups placed similar emphasis upon the three data sources at each stage, evaluators were more willing in the first two stages of development to release the products and advance them to the next stage of development; this occurred even though the evaluators were asked to respond to the items as if they were developers. In design test, 80% of the responses made by the five

evaluators to the seven situations favored product advancement; this compared with only 33% of the responses made by the five developers. In pilot test, 75% of the responses made by the evaluators indicated that the product should be advanced; 41% of the developers' responses indicated advancement. In field test, 46% of the evaluators' responses and 41% of the developers' responses favored product advancement.[4] Thus the two groups neared agreement as the product advanced in development (see Appendix A).

There were seven possible combinations of cost, performance and spin-off data in each developmental stage. In both design and pilot test, developers and evaluators agreed only when the variables existed in combinations where performance data was either "high" or "low." In these stages, the two groups agreed to advance a product when performance was "high" (and cost and spin-offs medium), and to retain a product when performance was "low" (and cost and spin-offs medium). In field test, developers and evaluators again agreed on high and low performance situations, as well as in two additional combinations. Thus, for the particular situations addressed in this questionnaire performance data emerged as a key variable in decision-making, particularly in the early stages.

The questionnaire is not without limitations. The sample is quite small (N = 10); the product situations are limited and provide incomplete information in terms of the information available in actual developmental situations; additional variables such as product desirability, information on comparison groups, and the social utility of the product could have been included. Despite these limitations some interesting findings emerged, particularly in regard to the conservatism of the program developers, when compared with the evaluators, in advancing their program from one developmental stage to the next.

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[4] There was a total of 35 possible responses for the evaluators at each stage of development (5 evaluators X 7 situations); one developer failed to answer 6 items, leaving only 33 possible responses per stage for the developers.

This current undertaking represents only an exploratory use of a procedure for capturing decision-makers' policies, without regression procedures. Refinement of the instrumentation and methodology would appear to be worth undertaking for purposes of determining the most relevant program information on which developers could base their revision decisions, and also for selecting appropriate comparison groups to use in making judgments concerning the worth or merit of a program.

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APPENDIX A

PERCENTAGE OF RESPONSES INDICATING WILLINGNESS TO ADVANCE THE PRODUCT FROM ONE DEVELOPMENTAL STAGE TO ANOTHER

		DECISION MAKER	
		Evaluators	Developers
STAGE OF DEVELOPMENT	Design Test	.80	.33
	Pilot Test	.75	.41
	Field Test	.46	.41

A P P E N D I X B

- DIRECTIONS -

In filling out this questionnaire, you are to assume that you are a product developer with decision-making authority. There are 22 situations involving a product at different stages of development. Following each situation, there are two questions for you to answer based on the information provided. The first question asks you to decide whether a product is ready to be moved on to the next developmental stage. The second question asks you to weigh which of three variables (cost, performance, and spin-offs) you relied most and least on in making your decision in question #1. Throughout the questionnaire there are terms that need to be interpreted similarly by each respondent. The definitions that follow should be used by you for this purpose. Do not assume any variables other than those given.

- DEFINITIONS -

PRODUCT
The result of a developmental effort such as a set of instructional materials, media package, or assessment instruments.

PRODUCT DEVELOPER
The individual who has the accountability for the product as it progresses through its stages of development.

DESIGN TEST
A stage in the developmental process in which the prototype product is operationalized sufficiently to be tested for the first time within the classroom. Several cycles of of revision may be undertaken with the emphasis entirely upon formative feedback.

PILOT TEST
The stage of product development following design test in which the product is installed in a limited number of treatment and comparison classrooms. Emphasis is on the use of summative as well as formative feedback.

FIELD TEST
The stage of product development following pilot test in which large scale comparative testing of the refined product is undertaken to determine its worth in relation to competitors.

DEVELOPMENT DECISION
A judgement made by the product developer, based upon cost, performance, and spin-off data to retain or to advance a product from one stage of product development to the next.

COST
Economic costs (e.g., personnel, materials) and opportunity costs (what else could have been done with available funds) incurred in the design and production of a product at any given stage in the developmental cycle.

SPIN-OFFS
Effects derived from the use of the product that are independent from those obtained or expected in direct assessment of the program goals and objectives. Examples: increase in average daily attendance, fewer program dropouts, etc.

PERFORMANCE
For this questionnaire, performance may be viewed as change in cognitive and affective behavior as a result of product intervention. These behavior outcomes are measured by norm- and criterion-referenced instruments, observation methods (category and rating scales) and other assessment techniques.

HIGH - MEDIUM - LOW
Descriptors which connote the extent to which the product met the expectations of the developer. These are to be considered in terms of the input (costs) as well as the output (performance, spin-offs) variables in product development. These descriptors are labels which <u>you</u> would have applied to the variables in question.

PRODUCT DEVELOPMENT SITUATIONS

REMINDER: The variables used in this questionnaire may not be the only, nor necessarily the most important, variables a decision-maker would consider. For this task, however, you should assume (as mentioned in the "Directions") that the variables given are the only ones available on which to make a decision.

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1. The product is in the design test stage. You have the following information:

Performance data:	high
Cost data:	medium
Spin-offs	medium

   As a decision-maker, is this product ready to be moved to the next stage of development?

   QUALIFICATIONS

   ( ) YES
   ( ) NO

   In making you decision, information from which variable (cost, performance, or spin-off) did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

2. The product is in the field test stage. You have the following information:

Performance data:	medium
Cost data:	medium
Spin-off data:	low

   As a decision-maker, is this product ready to be moved to the next stage of development?

   ( ) YES
   ( ) NO

   QUALIFICATIONS

   In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

3. The product is in the pilot test stage. You have the following information:

Performance data: medium
Cost data: high
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

4. The product is in the field test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making you decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

5. The product is in the design test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

6. The product is in the pilot test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

7. The product is in the pilot test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: low

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

8. The product is in the design test stage. You have the following information:

Performance data: medium
Cost data: high
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) COST
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

9. The product is in the pilot test stage. You have the following information:

Performance data:	high
Cost data:	medium
Spin-off data:	medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

10. The product is in the design test stage. You have the following information:

Performance data:	low
Cost data:	medium
spin-off data:	medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEASE ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

11. The product is in the field test stage. You have the following information:

Performance data:	medium
Cost data:	low
Spin-off data:	medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

12. The product is in the design test stage. You have the following information:

Performance data: high
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

13. The product is in the pilot test stage. You have the following information:

Performance data: medium
Cost data: low
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

14. The product is in the field test stage. You have the following information:

Performance data: high
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

15. The product is in the design test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: low

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

16. The product is in the field test stage. You have the following information:

Performance data: medium
Cost data: high
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

17. The product is in the field test stage. You have the following information:

Performance data:
Cost data: medium
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

18. The product is in the design test stage. You have the following information:

Performance data: medium
Cost data: low
Spin-off data: medium

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

19. The product is in the pilot test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: high

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

20. The product is in the design test stage. You have the following information:

Performance data: medium
Cost data: medium
Spin-off data: high

As a decision-maker, is this product ready to be moved to the next stage of development?

QUALIFICATIONS

( ) YES
( ) NO

In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

21. The product is in the field test stage. You have the following information:

    Performance data: medium
    Cost data: medium
    Spin-off data: high

    As a decision-maker, is this product ready to be moved to the next stage of development?

    QUALIFICATIONS

    ( ) YES
    ( ) NO

    In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

22. The product is in the pilot test stage. You have the following information:

    Performance data: low
    Cost data: medium
    Spin-off data: medium

    As a decision-maker, is this product ready to be moved to the next stage of development?

    QUALIFICATIONS

    ( ) YES
    ( ) NO

    In making your decision, information from which variable did you rely:

MOST ON?	LEAST ON?
( ) Cost	( ) Cost
( ) Performance	( ) Performance
( ) Spin-offs	( ) Spin-offs

- Thank You -